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OBJECTIVES

1. Code development and delivery
2. Validation prototyping activities.

TASK PROGRESS

1. Code development/ deliveries

We continue development of the version 16-day, NDVI code at 250m resolution. The science code to this algorithm is complete but much work remains in interfacing this code with the input/ output formats required in HDF format. Although we have no programmer onboard we are making considerable progress in familiarizing ourselves with the HDF protocols and standards.

2. Validation Activities

2.1 Walker-Branch Prototype Experiment (PROVE)

We participated in the August field campaign in Oak Ridge, Tennessee. Light aircraft with Exotechs were flown across various transects and ground-based LAI/ fAPAR measurements were made.

2.2 Proposal to LBA-Ecology NRA:

"Validation and Evaluation of Modis Data Products in the Large-Scale Biosphere-Atmosphere Experiment in Amazonia (LBA)"

The MODIS Instrument Land Science Team (MODLAND) is interested in participating in the Large-Scale Biosphere-Atmosphere Experiment in Amazonia (LBA) with the objectives of validation and evaluation of the MODLAND data products over the tropical land cover sites within the LBA field campaign. This is a no-cost proposal in which MODIS team members will evaluate the atmospherically-corrected, surface reflectance product; spectral vegetation indices; BRDF and albedo; fire and thermal anomalies; land cover and land cover change; surface temperature; and a set of vegetation biophysical products, including leaf area index (LAI), fraction of absorbed photosynthetically active radiation (fAPAR), and net primary production (NPP). The LBA experiment provides an excellent test site for MODLAND to evaluate the quality and performance of our algorithms and products in conjunction with in-situ measures of various ecological parameters. MODLAND will make available level 2 and level 3 gridded MODIS data products to the LBA-Ecology Science Team so as to maximize data

usefulness and evaluation by the broader scientific community. We plan on participating in field process studies, airborne radiometry acquisitions, and ground-based biophysical and radiometric measures. We plan on working over both LBA transects, encompassing dry and wet tropical forests, cerrado, and various classes of land use conversions.

2.3 MODIS Vegetation Index Validation Activities (revised, Aug. 1997)

1. Pre-launch phase: (August 97' - June 98')

- Walker-Branch, Oak Ridge Tennessee, Aug.97' (broadleaf forest)
- La Jornada, LTER, N.M., Sept-Oct. 97' (semi-arid veg.)
- H.J. Andrews, LTER, OR, April 98' (needleleaf forest)

2. Launch + 1 year (Sept. 98' to June 99') Based upon MODLAND ER-2 plans. However, these campaigns are not solely dependent on the ER-2 plane.

- Railroad Valley & Lunar Lake, NV, late Sept. - Oct. 98 (desert)
- ARM CART, OK , Oct. 98 (grassland + agric.)
- Harvard Forest & Howland, Maine, time: TBD (Strahler lead) (Broadleaf deciduous forest)
- Hoggs Island, Virginia LTER, time:TBD (Vermote lead) (Coastal vegetation)
- Maricopa & La Jornada, Sept-Oct. 98 (agric, & semi-arid veg.)

3. Launch + 2 years (July 99' to June 00')

- LBA sites, Brazil, Sept., 99' (Tropical forest, cerrado & agriculture)
- Mongolia grasslands, July-Aug. 99', joint measurements with ADEOS-2, GLI team.

All of the above field campaigns will include light aircraft and ground transect exotechs, sun photometer (reflectances & VI), and

measures of fAPAR, LAI; angular measures (view and sun); and possible ER-2 overflights.

2.4 Vegetation Index Response to Microphytic Crusts in Semi-Arid Regions

This is a vegetation index 'baseline' study in which we wish to accurately characterize the zero reference point of the vegetation index values. This is useful in calibration/ validation reference studies over the long term as well as in establishing the lower thresholds of vegetation detection. A summary of this study is presented below:

In this study, the optical properties of various microphytic crusts (mosses, lichens, cyanobacteria) were examined in dry and wet conditions and at nadir view as well as over a range of viewing angles at the principal plane. In an attempt to decouple the soil background influence on the normalized difference vegetation index (NDVI) from the photosynthetic signal, additional VIs were employed, including the first derivative spectral index, soil-adjusted vegetation index (SAVI) and the perpendicular vegetation index (PVI). All crusts demonstrated increased photosynthetic activity upon wetting with the cyanobacteria showing the weakest VI signal while the moss crust showed the highest VI response. All indices had some soil-related problems which warranted caution in VI interpretation. All indices also had significant and dissimilar anisotropy behavior and view angle variations in VI responses exceeded, at times, those variations associated with wetting of the crust surface. This demonstrates the need to be cautious in proper interpretation of the wide swath view data from the AVHRR sensor satellite system.

Next Quarter Activities

1. Complete a manuscript for the special MODLER's issue concerning joint LTER/ MODIS activities in the realm of validation. The proposed title of this paper is "MODIS-like vegetation index baseline behavior across the LTER network". In this paper we explore and present the validation program for vegetation indices utilizing the LTER sites where available TM and AVIRIS imagery can be collected. We tentatively have located and acquired TM imagery for the

Andrews (Temperate Conifer Forest), Coweeta (Eastern Deciduous Forest), Jornada (Desert Shrub and grass), Konza (Tall Grass Prairie), and Virginia Coast (Coastal Veg.) sites. AVIRIS imagery has been collected for the Harvard Forest, Andrews, Bonanza Creek, Hubbard Brook, and Jornada LTER sites.

2. Delivery of version 1 code for vegetation index at 250m and 16-day compositing.
3. Continue on development of protocol for assessing error budgets for the vegetation indices and for the validation.
4. Complete contribution for the MODLAND- TGARSS' special issue.
5. Complete manuscript entitled "The Use of Vegetation Indices in Forested Regions: Issues of Linearity and Saturation" for the JGR - MODIS special issue.